FOOD IRRADIATION
— THE GLOBAL AGENDA —

Irradiated food has never been proved safe to eat, so we should wise-up when UN and government organisations, health authorities and transnational food corporations tell us that it is.

by Susan Bryce © 2000–2001

Publisher/Editor
Australian Freedom & Survival Guide
PO Box 66
Kenilworth, Qld 4574, Australia
E-mail: sbryce@squirrel.com.au
Website: www.squirrel.com.au/~sbryce/

WHAT'S ON THE MENU?

Time to eat breakfast, brought to you by the New World Order Food Company in the year 2005. First up, a bowl of Perkie Pops™, a sugar-laden cereal "fresh" from the cardboard box. The primary ingredients are genetically engineered corn, wheat and rice, with a few chemical additives thrown in to stop the oxidation of fats. The TV commercial says that Perkie Pops™ really is the best breakfast cereal, because the box is emblazoned with the Radura—the international symbol for radiation-treated food.

Top the Perkie Pops™ with some sliced, radiation-treated Sanitary Strawberries™ that have been sitting in the fruit bowl for three weeks. Pour on some cold-pasteurised Electro Moo Milk™. Still hungry? Then splash out with a glass of X-ray–treated Neutron Power Orange Juice™ while you sizzle that 21-day-old Triple T-bone™ with three times the meat and half the fat, thanks to some growth hormones and genetic manipulation. Make yourself a cup of tea, safe in the knowledge that it is free from any nasty bacteria because the tea leaves were bombarded with ionising radiation. And as for the water, rest easy! It was X-ray sterilised at the local water treatment plant.

For lunch, it's a Big Rad™, the convenient, ready-to-eat hamburger—the one with the freshness sealed in when it was made at the hamburger factory 24 months ago. It's been treated with radiation, too, and will last indefinitely on the pantry shelf. Just pop it in the microwave oven, nuke for 30 seconds and enjoy!

Don't forget to make a note to buy a kilo of Gray's Gourmet Chook Patties™ for dinner. They've been exposed to a radioactive source at Gamma Fire Power, the local food irradiator at the industrial estate just down the road, 200 metres from your children's school. Radiation-treated for 20 minutes, the Chook Patties are sure to be completely sterile and safe to eat. And don't forget Poppa's Perfect Round-up Potatoes™. They've been in the potato sack now for six months and still haven't sprouted! They're on the menu tonight, along with the Chook Patties. At the end of the day, indulge yourself with a glass of New Clear™, a fine wine made from radiation-treated grapes, bottled in a radiation-treated bottle and corked with a radiation-treated cork.

Does this sound unpalatable? Enough to make you sick? It's just a taste of what the nuclear industry, international organisations, government regulators and transnational food companies have in store for us.

Food irradiation is on the global agenda and, very soon, nations will be powerless to turn irradiated food away from their shores. Sovereign nations will be compelled to irradiate food to conform with international "standards" dictated by the organs of global governance.

This article investigates the global push to irradiate our food. The key questions addressed are: What is food irradiation? Who wants it and why? What are the effects of irradiation on our food? The article also examines what we, as concerned consumers, can do to say no to the nuclear massacre of our food.

WHAT HAPPENS IN AN IRRADIATION PLANT

Food irradiation is a technology which uses radioactive isotopes (nuclear waste) or a linear accelerator to create an amount of radiation equivalent to 10 million to 70 million chest X-rays. When the food item is zapped, the radiation initiates a complex sequence of reactions that literally rip apart the molecular structure of the food. This process creates new—and in some cases, unidentified—chemicals which have not been proved safe.

Vitamins and enzymes are destroyed, and fresh food becomes dead food.[1] Irradiated food has been described as "the food that would last forever", because the process is used to prolong shelf-life or to kill bacteria and insects.

Two of the most toxic and deadly substances known to humanity are used in the process of food irradiation. They are cobalt-60 (the more widely used) and caesium-137. Disposal of radioactive cobalt and caesium currently presents a considerable problem for the nuclear industry because of the quantities produced as wastes in nuclear power stations and the length of time they take to decay.[2]

The push for food irradiation has always come from the nuclear establishment, with the aim of extending the nuclear fuel cycle. The idea is to spread nuclear waste widely in many glorified nuclear dumps such as food irradiators, instead of a few large nuclear dumps that are running out of space. Start-up is always done with radioactive cobalt, with the real intention being to switch over to radioactive caesium.

At the heart of a food irradiation plant is a shiny rack of about 400 gamma-ray-emitting cobalt-60 rods about 18 inches (45.7 cm) long and the size of a fat crayon. This highly radioactive source is housed in a chamber surrounded by a concrete wall, six feet (1.83 m) thick. When not in use, the rack of cobalt-60 rods is submerged in a pool of cooled water, 15 feet (4.57 m) deep, which absorbs the gamma rays.

At the push of a button, hydraulic arms lift the cobalt rack out of its protective pool. Then tall metal boxes, packed with food destined for consumption, slide into the irradiation chamber on an overhead monorail. Boxes move in a zigzag pattern around the radioactive rack, ensuring gamma rays thoroughly penetrate the food.[3] Treatment times vary: fresh strawberries take 5 to 8 minutes; frozen chicken takes as long as 20 minutes.

The Radura symbol

In modern food irradiators, food can be loaded into the irradiator on standard pallets. Once inside the irradiator, food receives the requisite radiation dose—the amount of radiation energy that is absorbed by the food inside the irradiation cell. The dose is now generally measured by a unit called the *gray* (Gy), but in earlier work the unit was called the *rad* (1 Gy = 100 rads).[4]

THE PROPONENTS OF FOOD IRRADIATION

Research into food irradiation started in the early years of the 20th century, and really took off after the Second World War when the US Army began to conduct intensive inquiries as part of President Eisenhower's "Atoms for Peace" program. The objective was to preserve food so that frontline troops could receive "fresh" food at all times. Most of the developed countries throughout the world conducted their own scientific research programs into the effects of radiation on food.

In the 1970s, a well organised and financed campaign emerged to press for food irradiation as an acceptable food manufacturing process.

The main players who have been shaping the agenda for food irradiation are members of the United Nations system of organisations, the transnational food companies and government regulators. Four key members of the UN "family" are spearheading the drive for food irradiation: the International Atomic Energy Agency, the Food and Agriculture Organization (FAO), the World Health Organization (WHO) and the World Trade Organization (WTO).[5]

The FAO and the WHO argue that food irradiation is necessary to deal with the problems of world hunger and to reduce the incidence of food-borne diseases. The FAO says irradiation will reduce losses in storage by killing off pests and micro-organisms and thus help increase the year-round supply of "wholesome" food. The evidence for this claim is weak, and it can equally be argued that far more could be achieved by improving manufacturing practices and providing storage plants secure against the entry of rodents and pests than by using irradiation to kill those present in harvested foods.

WHO has been an enthusiastic supporter of food irradiation as a means of reducing food-borne disease. Many parts of the food chain have become completely contaminated with organisms such as salmonella, and the cost of decontaminating the whole process would be enormous. This is particularly true for poultry, for example. Through inaction, many countries have allowed the poultry production system to become contaminated with salmonella. This organism is endemic in the farm environment; it is present in the feedstocks and in the housing and transport systems used. Rather than attempt to introduce good manufacturing practices and ensure that the flocks are salmonella-free and kept that way, it appears to be easier to allow high levels of contamination to persist and then to irradiate the poultry to kill it all off.[6]

The 1970s saw the International Atomic Energy Agency (IAEA) hijack global food policy by joining forces with the FAO and the WHO. These three organisations formed the Joint Expert Committee on Food Irradiation (JECFI). Composed of scientists, JECFI was charged with investigating the "wholesomeness of irradiated food". The USA, Australia and India were among the countries represented on the committee.

In 1976 and again in 1980, JECFI concluded that the irradiation of any food commodity up to an overall average dose of up to 10 kilograys presents no toxicological hazard and no special nutritional or microbiological problems.[7] This conclusion was reached despite the fact that there have never been comprehensive studies conducted on the long-term impacts of a diet of irradiated food.

In 1983, the JECFI conclusion was adopted as an international "standard" by the Codex Alimentarius Commission, a joint body of the FAO and WHO. The Codex is the vehicle for harmonising international rules for trade in food, making it easy for countries and companies to import and export food. By definition, the Codex opposes national and local restrictions, labelling and preferences.

Typically, consultants from transnational food companies and members from industry representative bodies are appointed to the national Codex committees. The Codex is currently headed by Tom Billy, Chief of the US Department of Agriculture's Food Safety and Inspection Service, the man in charge of deregulating the meat industry in the United States.[8]

The International Atomic Energy Agency coordinates the activities of the International Consultative Group on Food Irradiation (ICGFI), which currently has 39 members from governments using or interested in food irradiation.[9] ICGFI promotes the use of irradiation through literature and by hosting seminars, holding

meetings and scheduling press conferences around the world which set out the purported advantages of irradiation.[10]

In 1997, the World Health Organization released a landmark media statement on food irradiation, declaring that "no ceiling should be set for food irradiated with doses greater than the currently recommended upper level of 10 kGy by the Codex Alimentarius Commission". According to the statement: "...the actual amount of ionising radiation applied is of secondary consideration ... one can go as high as 75 kGy, as has already been done in some countries, and the result is the same—food is safe and wholesome and nutritionally adequate … given these reassuring conclusions, the World Health Organization hopes that food irradiation will now become more acceptable as a means for the improvement of food safety."[11]

WHAT HAPPENS TO IRRADIATED FOOD

For all those worried souls who think they should replace their calorie counters with Geiger counters, forget it! The experts say irradiated food doesn't become radioactive, and irradiation is a completely safe process. Their conclusions about food irradiation are always expressed in terms of the benefits and safety of irradiated food. The uncertainties about safety never appear in the reports of international organisations advocating irradiation. If chemical changes are referred to at all, they are said to be "not significant" or similar to those produced in other food-processing techniques.

While many of the chemical changes are similar to those produced by other food-processing technologies, the quantities of chemicals produced are very different. When radiation strikes food or other material, it transfers its energy. This energy transfer can cause heating, as with microwave cooking. At a certain level, the radiation has sufficient energy to knock the electrons out of the atoms of the material being bombarded. The molecular structure of food is broken up when irradiated, and free radicals are formed. The free radicals can react with the food to create new chemical substances called *radiolytic products*. Some are known carcinogens, such as benzene in irradiated beef. Others are unique to the irradiation process.

Although irradiation can kill bacteria, it will not remove the toxins created by the bacteria in the first place. Increased production of aflatoxins following irradiation was first found in 1973[12] and confirmed in 1976 and 1978. Aflatoxins are powerful agents for causing liver cancer. Vitamins A, C, D, E and K and some of the B vitamins, particularly B1, B2, B3, B6 and B12, are damaged by irradiation. The extent of vitamin loss depends upon the food and dose given. Fruit juices suffer more than fresh fruits, and these more than vegetables, grains and meat products.[13]

Irradiation converts nitrate to nitrite in a dose-dependent manner. Mutagenesis is directly proportional to nitrite concentration. Nitrite is a reactive molecule and reacts with nucleic acids and various amino acids in protein to form the known family of carcinogens referred to as the *nitrosamines*. These have been demonstrated to be potent carcinogens in humans.

The proponents of irradiation say that the process reduces the need for harmful food additives. (Interestingly, we have always been told that food additives are harmless.) However, the process of irradiation actually requires the use of *extra* food additives in order to control undesirable effects. Additives which may be used include sodium nitrite, sodium sulphite, ascorbic acid, BHA, BHT, potassium bromate, sodium tripolyphosphate, sodium chloride and glutathione.

Some foods, particularly milk and other dairy products, do not take well to irradiation. Terms such as "chalky", "scorched", "candle-like" and "burnt wool" have been used to describe the flavour and smell of irradiated milk, while irradiated meat is said to have a "wet dog smell". Irradiated fats have been described as "musty" or "nutty".[14]

The use of additives is not restricted to high-dose applications where obnoxious radiation flavours become pronounced, but can be used for low-dose uses to prevent discolouration and other undesirable effects such as bleeding and breakdown of fats in meat.

Other forms of radiation treatment for food are being developed. Consumers should be alerted to the treatment called *cold pasteurisation*, which uses electron beam technology to pasteurise milk and fruit juices.[15] The use of X-rays instead of electron beams is also being investigated, and new accelerator technologies are being introduced commercially which allow electron beams to be converted to X-rays for greater penetration into foods.[16]

QUESTIONS OVER IRRADIATED FOOD SAFETY

The safety of a long-term diet of irradiated food has never been established. One study, often quoted in pro-irradiation literature

FOOD TREATED WITH RADIATION

Provided that irradiation is properly controlled, food should not become radioactive. However, ionising radiation with high energy can cause radioactivity to be created in the material that is bombarded. It is important, therefore, that only lower-energy ionising radiations are used in irradiation of food. If the radioactive source were damaged, food could become contaminated with radioactivity. Great care needs to be taken to prevent accidents at irradiation plants.

The following effects are produced when food is irradiated:

Radurisation – Low doses below 1 kGy: Sprouting of vegetables such as potatoes and onions can be inhibited so that they keep longer. Ripening of fruits can be delayed so that they keep longer and can be transported longer distances. Insect pests in grains, wheat, rice and spices can be killed.

Radicidation – Medium doses between 1 kGy and 10 kGy: The number of micro-organisms, such as yeasts, moulds and bacteria that lead to food spoilage, can be reduced so as to extend the life of foods and reduce the risk of food poisoning.

Radappertisation – High doses above 10 kGy. At these extremely large doses above 10 kGy, food can become completely sterilised of all bacteria and viruses. This can be used mainly for meat products, allowing them to be kept indefinitely.

(Source: T. Webb and T. Lang [London Food Commission], *Food Irradiation: The Facts*, Thorsons Publishing Group, UK, 1987)

but never sourced or referenced, was conducted in the early 1980s. The study, quoted by the IAEA in its brochure, "Facts About Food Irradiation",[17] involved more than 400 "volunteers" who ate irradiated food for 7 to 15 weeks as part of eight separate studies in China. The volunteers reportedly showed "no more chromosomal abnormalities"—an early warning sign of cancer-causing activity—than those who ate non-irradiated foods.

Another study is quoted in the expert testimony to the US congressional hearings into food irradiation in June 1987.[18] Cited by George L. Tritsch, PhD, cancer research scientist at Roswell Park Memorial Institute, New York State Department of Health, the study was conducted in 1975 and was originally documented in the *American Journal of Clinical Nutrition*.[19] Indian researchers were concerned with the effects of irradiated food on malnourished people. They researched this with 10 children suffering from kwashiorkor, a severe lack of protein. The 10 children were divided into two groups of five. Before the trial started, blood samples were taken and examined as the starting point for each child. One group of five children was the control group, the other the experimental group. Diets were identical, except for the fact that wheat for the experimental group had been freshly irradiated with a dose of 0.75 kGy, the dose recommended for grain disinfestation. After four weeks, blood samples were taken and four of the five children eating irradiated wheat showed gross chromosomal polyploidy with other abnormal cells also present.[20] After six weeks, blood samples were taken from the experimental group and a sharp increase in polyploid lymph cells was found compared to the level at four weeks. The control children showed no abnormal cells in their blood during the trial.

After four weeks, blood samples were taken and four of the five children eating irradiated wheat showed gross chromosomal polyploidy with other abnormal cells also present.

To protect the experimental group children from eventual harm, the researchers decided to halt the trial at this stage. They realised that freshly irradiated wheat could be problematic. Instead of the wheat being fed within two to three weeks of irradiation, it was first stored for 12 weeks before it was used in the diet of a new group of five children. This time, the polyploid cells showed up for the first time after six weeks. After the irradiated wheat had been withdrawn, it took 24 weeks before the blood of the children fed irradiated wheat reverted to normal and all abnormal cells had completely disappeared. Proponents of food irradiation have attempted to dismiss this study, since only a small number of individuals was involved.

Different doses of radiation produce different amounts of radiolytes and different kinds of chemical products. A vast number of new molecules can be formed from the irradiation of a single molecular species, to say nothing of a complicated mixture of food. Theory cannot predict the nature or number or quantity of the new compounds, which vary depending on the kind of food, the season and location in which it was produced.

In the 1970s, the US Food and Drug Administration (FDA) questioned the safety of radiolytic products and reviewed over 250 studies evaluating substances formed in irradiated foods, using data from a US Army research program. About 65 volatile substances were identified in irradiated foods (the FDA focused on volatile substances because they would likely be more toxic than non-volatile substances). Twenty-three of the substances were also found in thermally processed (or cooked) foods and 36 in other non-irradiated foods. Only six could not be confirmed in the scientific literature as identical to substances found in foods, although they were similar to natural food constituents. Collectively, these six substances would be present in foods in the amount of three milligrams per kilogram—"like three drops of water in a swimming pool", according to the FDA, dismissing the problems in one fell swoop.[21]

WHAT'S IN STORE FOR US ALL

The pro-irradiation literature does not address the unknowns of food irradiation. Just as chemicals can cause cancer or genetic effects and it is best to assume there is no safe level of exposure to them, so too for radiation. Any exposure to chemicals or radiation can cause the initial damage that develops into a cancer.

Many and varied foods are being irradiated and marketed commercially in developed and developing countries. The ICGFI has been particularly active in promoting irradiation to developing countries. Bangladesh is irradiating dried fish, frozen fish and some cereal products. China has more than 60 irradiation facilities treating a wide variety of foods including garlic, rice, spices and condiments, packaged foods, Sichuan sauce, fruits and meat. The quantities of irradiated products are in thousands of tonnes. Indonesia is irradiating dried spices, tuber and root crops, grains, dried fish and frozen foods both for test marketing and commercial purposes. In 1996, total quantities of irradiated products exceeded 6,000 tonnes. The Republic of Korea commercially irradiates spices, dried vegetable seasonings and ginseng products. An irradiation facility in Thailand irradiates nahm (fermented pork sausage), spices, seasonings, herbs and crude enzymes for commercial purposes. Vietnam irradiates commercial quantities of tobacco for insect disinfestation, in addition to some food such as onions and dried fish. India irradiates spices for commercial purposes. More commercial irradiation facilities are either planned or under construction in China, India, the Republic of Korea, Malaysia, Thailand and Vietnam.[22]

In the United States, the FDA gave approval for the irradiation of red meat on 23 February 2000. The FDA has also approved irradiation for a variety of other foods, including fresh fruits and vegetables and spices. An FDA brochure, "Food Irradiation—A Safe Measure", published in January 2000, says the agency determined that the process is safe and effective in decreasing or eliminating harmful bacteria and states that irradiation also reduces spoilage bacteria, insects and parasites, and in certain fruits and vegetables it inhibits sprouting and delays ripening. For example, irradiated strawberries stay unspoiled for up to three weeks, versus three to five days for untreated berries.

The organisations which contributed to the content and printing of the FDA brochure were the American Meat Institute, the Department of Health and Human Services (US FDA), Food Marketing Institute, Grocery Manufacturers of America, National Cattlemen's Beef Association, National Food Processors Association and The American Dietetic Association.

Herbs, spices and vegetable seasonings are among the first

foods to be targeted for irradiation. Canada quickly approved them for irradiation,[23] and now Europe and countries such as Australia are waging similar pro-irradiation campaigns.

After a decade of debate, the European Parliament has issued a directive to create a legal framework for the single market for foodstuffs treated with ionising radiation. The implementing directive at this stage includes only one group of products—namely, dried aromatic herbs, spices and vegetable seasonings. The final list of foods to be irradiated is expected to be considered by the European Parliament this year.[24]

In Australia, the company Steritech Pty Ltd has applied to the Australia New Zealand Food Authority (ANZFA) to irradiate herbs (fresh and dried, including garlic, onions and ginger), teas (including herbal teas), nuts and spices.[25] Australia had a moratorium on food irradiation in place until August 1999 when, together with decisions about genetically modified foods, the Australia New Zealand Food Standards Council slipped through the removal of the ban with no public debate whatsoever. ANZFA issued a detailed information package on irradiation to the media and placed it on its website on 6 August 1999, but little media reporting has ensued on the topic. ANZFA has invited public submissions regarding the Steritech's application, and, although the initial round of public "consultation" has already been held, a second round and consideration of a draft report will take place in February/March 2001 and a decision regarding Steritech's application will then be made. To make a submission, visit www.anzfa.gov.au or write to ANZFA, PO Box 7186, Canberra Mail Centre, ACT 2610.

Transnational food companies see the dollar signs before their eyes when it comes to irradiation. The extension of shelf-life and storage periods which food irradiation allows is attractive to the transnationals because it enables them to increase their profits by reducing wastage and to deliver products to the shops when it is economically advantageous to do so. It also enables them to transport exotic foods around the world more easily.

Leading representatives from transnational food companies and grocery manufacturing associations have stated their intention to use food irradiation as the process becomes more widely accepted. The Grocery Manufacturers of America website[26] quotes the President and Chief Executive Officer of ConAgra Inc., Bruce Rhode: "ConAgra stands ready to use irradiation technology once public acceptance of irradiation becomes stronger and when irradiation is commercially available." On the same website, Manly Molpus, President and Chief Executive Officer of Grocery Manufacturers of America, tells readers: "Irradiation is likely to be generally accepted by Americans and be as useful to their health and safety as pasteurisation was for milk a decade ago."

Getting consumers to "generally accept" irradiation may be difficult. However, much of this "acceptance" will be forced upon sovereign nations under the provisions of the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (SPM). This agreement is a global standard for food sanitation and sterilisation, and includes food irradiation as an acceptable treatment process. At present, governments can deny entry of any products into their country. However, under the terms of the SPM agreement, governments will be required to justify, on scientific grounds, why a particular product should be denied entry. With these considerations and with irradiation endorsed by regional plant protection organisations and international organisations such as the WHO and the FAO as a quarantine treatment for fresh agricultural produce, governments will find it extremely difficult, if not impossible, to deny the entry of food treated by irradiation.

The international symbol for radiation-treated food is the Radura—a round flower with two petals pictured inside a broken circle. The Radura is marketed as an emblem of quality. It was first used for South African and Dutch irradiated foods. The colour of the Radura emblem is green, which consumers may unconsciously associate with fresh, clean and environmentally safe produce. In reality, irradiated food may be old and stale, and irradiation facilities are far from environmentally friendly.

Although food may be marked "treated with irradiation" or show the Radura emblem, at present there is no way of knowing whether unlabelled food has been radiation-treated. Even the best regulations on labelling are of limited value unless they can be enforced.

Until a single test for detecting irradiated food is developed, and monitoring agencies are trained to use it, consumers will be at the mercy of food processors who are responsible for the labelling of irradiated food. None of the labelling presently requires the dose of radiation to be indicated, nor the number of times the product has been irradiated.

IRRADIATION ACCIDENTS

Decisions to irradiate food extend beyond the concerns of consumers. An irradiation facility in the local community means the presence of large quantities of radioactive material as well as

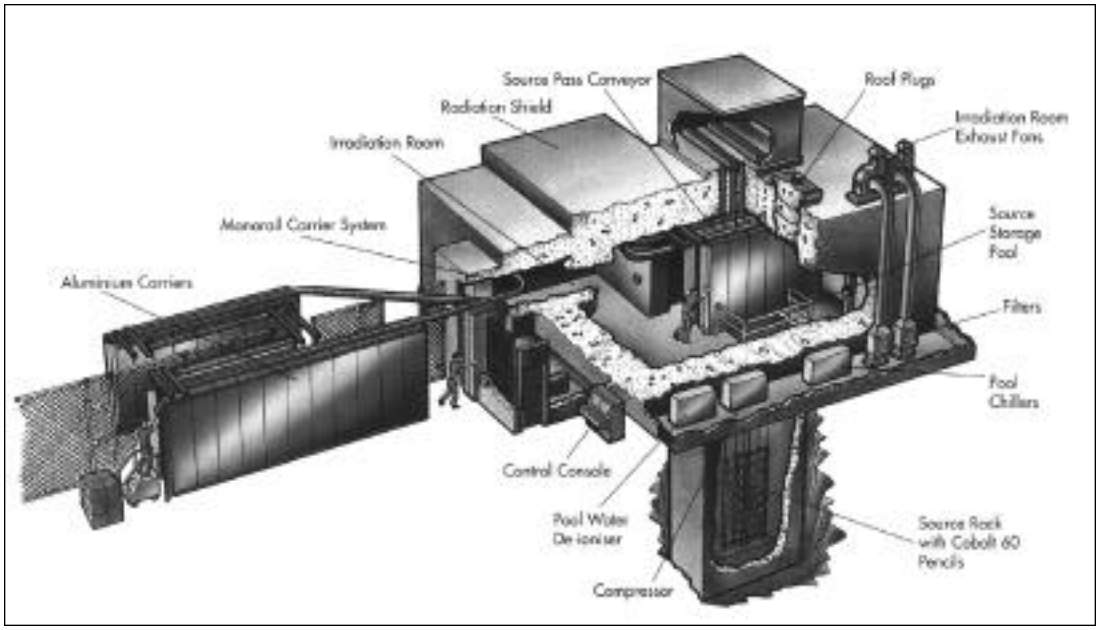

Diagram of a cobalt-60 irradiation facility (Source: Steritech Pty Ltd brochure)

transport of the radioactive material to and from the facility.

Since 1974, the US Nuclear Regulatory Commission has recorded 54 accidents at 132 irradiation facilities worldwide.[27] The IAEA has dismissed many of the accidents as "operational incidents". Some of the major accidents in the United States include:

• In 1991, a worker at a Maryland facility suffered critical injuries when exposed to ionising radiation from an electron-beam accelerator. The victim developed sores and blisters on his feet, face and scalp, and lost fingers on both hands.

• In 1988, Radiation Sterilizers, Inc. (RSI) in Decatur, Georgia, reported a leak of caesium-137 capsules into the water storage pool, which endangered workers and contaminated the facility. Workers then carried the radioactivity into their homes and cars. Seventy thousand medical supply containers and milk cartons were recalled because they had been contaminated by radiation.[28] Clean-up costs exceeded $30 million, and taxpayers had to foot the bill.

• In 1986, the NRC revoked the licence of a Radiation Technology, Inc. (RTI) facility in New Jersey for 32 worker-safety violations, including throwing radioactive waste out with the garbage and bypassing a key safety device. As a result of this negligence, one worker received a near lethal dose of radiation.

• In 1982, an accident at International Nutronics in Dover, New Jersey, contaminated the plant and forced its closure. Radiation baths were being used to purify gems, chemicals, and medical and food supplies.

• In 1974, an Isomedix facility in New Jersey flushed radioactive water down toilets and contaminated pipes leading to sewers. Also that year, a worker received a dose of radiation considered lethal for 70 per cent of the population. Prompt hospital treatment saved his life.[29]

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A GLOWING FUTURE?

Irradiation of food is only part of the glowing future that international agencies, governments, corporations and the nuclear industry are investigating. There are many plans for the use of irradiation in other areas, such as soil sterilisation to eliminate weed seeds, insects and fungi.

Fortunately at present, existing technology cannot be applied to in-field agriculture, but it is now possible to irradiate bagged potting soils and similar products. The irradiation sanitisation of reusable greenhouse materials (pots, growing substrates, etc.) is currently done on contract for the greenhouse industry by irradiation companies in The Netherlands. Also, in several countries, various imported products are irradiated to control weed seeds that might inadvertently be present (such as in wild bird seed).

Many products which we use in our daily lives have been irradiated. Medical disposable supplies, cotton balls, contact lens solution, make-up, wine corks and wine cask bladders, bottles and plastic containers, feminine hygiene products, beehives (minus the bees) and packaging materials are just some of the products routinely irradiated for sanitation purposes. As there are no labelling requirements for non-food items, consumers are left in the dark as to which products have been radiation-treated and what dose has been used.

There are several steps we can all take to avoid irradiated foods. Try to buy locally grown produce and avoid imported foods which may have been irradiated. In some countries, wheat, potatoes, onions and seafood may have been irradiated on a commercial scale, but processed foods manufactured from these ingredients are not labelled with regard to the irradiated ingredients.[30] Support organic farming producers and buy traditionally prepared foods rather than mass-produced foods. Lobby governments to ensure that irradiated food components and food packaging are also declared on food labels.[31] Write to or e-mail supermarkets, food corporations and food manufacturers to tell them you will not buy irradiated food. Write letters to the editor of your local and national newspapers and phone talkback radio shows about food irradiation. Convene public meetings and discussion groups. Grow a food garden in your own backyard. If you grow it, you know it!

In its brochure, "Facts about Food Irradiation", the International Atomic Energy Agency says: "The view that consumers are opposed to buying irradiated food cannot be substantiated."[32] This outrageous statement must be challenged. We must become vocal opponents of the pro-irradiation lobby and its powerful propaganda. The public needs more information than just to be told that irradiated food is "safe". The public needs to know the scientific uncertainty that underlies statements from so-called expert organisations.

Homes without kitchens, houses without gardens, grocery shopping via the Internet...every day we become further removed from our food and more dependent upon others to provide this basic requirement. Unless we reclaim responsibility for our own food and work towards food self-sufficiency as opposed to food security, *our* future is in *their* hands. ∞

Endnotes

1. See www.dkp-ml.dk/netactivist/ food_E5.htm.
2. Cobalt-60 is the most widely used radiation source for food irradiation. However, US company GrayStar is developing a prototype irradiator which will generate gamma rays using caesium-137, which GrayStar would chemically separate from high-level nuclear waste. The prototype machine, 10 feet wide by 8 feet long and 28 feet high (3 x 2.4 x 8.5 metres), is designed to be installed alongside a meat packaging or food processing line.
3. Skerrett, P.J., "Food Irradiation: Will It Keep the Doctor Away?", *Technology Review*, www.techreview.com/articles/nd97/skerrett.html.
4. Webb, T. and Lang, T. (London Food Commission), *Food Irradiation: The Facts*, Thorsons Publishing Group, UK, 1987.
5. The UN lists the WTO and also the IMF and World Bank as members of the United Nations System of Organizations.
6. For an in-depth exposé of America's meat industry, read Gail Eisnitz's book, *Slaughterhouse: The Shocking Story of Greed, Neglect, and Inhumane Treatment inside the US Meat Industry* (Prometheus Books, 1997). *Slaughterhouse* documents the meat industry's heavy use of toxic chemicals, drugs, steroids, hormones and rendered animal protein (animal cannibalism). Problems of toxic sewage and industrial sludge, genetic engineering, raw manure (as low-cost feed for animals), and other questionable practices are also covered in the book. For details, see www.hfa.org/slaughterhouse.htm.
7. World Health Organization, "The Wholesomeness of Irradiated Food", Report of the Joint FAO/IAEA/WHO Expert Committee, Geneva, 1977 and 1981, WHO Technical Report Series, Nos 604 and 659.
8. For further details on the Codex, see www.purefood.org/irrad/codexfaq.cfm.
9. ICGFI members are: Australia, Argentina, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, People's Republic of China, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Czech Republic, Ecuador, Egypt, France, Germany, Ghana, Greece, Hungary, India, Indonesia, Iraq, Israel, Italy, Republic of Korea, Malaysia, Mexico, Morocco, The Netherlands, New Zealand, Pakistan, Peru, The Philippines, Poland, Portugal, South Africa, Syrian Arab Republic, Thailand, Tunisia, Turkey, Ukraine, United Kingdom, United States of America, Vietnam and Yugoslavia.

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10. The brochure, "Catching the Wave", published on the IAEA website www.iaea.org, is an outstanding example of the type of public relations (propaganda) campaign which will target consumers over the next few years.
11. See www.who.org for the full text of the statement.
12. Bullerman et al., "Use of Gamma Irradiation to Prevent Aflatoxin Production in Bread", *Journal of Food Science* 1973:1238.
13. Webb and Lang, op. cit.
14. Josephson, Edward S. and Peterson, Martin S. (eds), *Preservation of Food by Ionizing Radiation*, CRC Press, Florida, USA, 3 volumes (vol. 1, 1982; vols 2 & 3, 1983).
15. Electron beam technology was initially developed as part of the US Strategic Defense Initiative, popularly known as "Star Wars". After the initiative lost funding, scientists continued to develop accelerator technologies and devise new uses for them.
16. US Food and Drug Administration Center for Food Safety and Applied Nutrition, "Kinetics of microbal inactivation for alternative food processing technologies – pulsed X-rays", June 2, 2000, www.mv.cfsan.fda.gov/~comm/itf-xray.html.
17. International Atomic Energy Agency, "Facts About Food Irradiation", www.iaea.org.
18. Verbatim testimony, US Congressional Hearings into Food Irradiation, House Committee on Commerce and Energy, Sub-Committee on Health and Environment, June 19, 1987. For more details, see Canadian Coalition for Nuclear Responsibility, "Potential Hazards of Food Irradiation", www.ccnr.org/food_irradiation.html.
19. Bhaskaram, C., "Effects of feeding irradiated wheat to malnourished children", *American Journal of Clinical Nutrition* February 1975; 28:130–135.
20. Polyploidy or endoreduplication is caused by a blocking of the last stage of a cell division. The chromosomes have reduplicated themselves, but the cell does not split into two parts, each with a normal set of chromosomes, so the result is one large cell with a double set of chromosomes.
21. See www.food-irradiation.com/you_asked.htm#.
22. Market Development for Irradiated Food in the Asia-Pacific. FAO/IAEA Coordinated Research Projects, www.iaea.or.at/programmes/nafa/d5/crp/d6_2006.html.
23. Canadian regulations have remained unchanged since 1989, when food irradiation was reclassified as a process rather than an ingredient. Canadian clearances in effect today include: potatoes and onions for sprout inhibition; wheat, flour and whole wheat flour for insect de-infestation; and spices and dehydrated seasonings for microbial reduction. See www.foodincanada.com/Content/03-96/F7_Features. html.
24. European Parliament, Joint Text for a European Parliament and Council Directive concerning Foods and Food Ingredients Treated with Ionising Radiation, 27 January 1999, www.dainet.de/bfe/Bfe-Englisch/Information/Lebensmittel.htm.
25. Steritech's application can be downloaded from the ANZFA website, www.anzfa.gov.au.
26. See www.gmabrands.com/pubpolicy/irradiation/index.cfm.
27. More than 170 companies throughout the world are irradiating food. The US irradiation companies listed by the Grocery Manufacturers Association are: Accelerator Technology Corporation; Alpha Omega Technology, Inc.; APA Inc./Titan Corporation; Food Technology Service, Inc.; Iotron Technologies, Inc.; and Isomedix.
28. See www.ratical.com/radiation/inetSeries/partialAccLs.html.
29. See www.sustainable-city.org/articles/irradiat.htm.
30. Ashton, J. and Laura, R., *The Perils of Progress: Health and Environment Hazards of Modern Technology and What You Can Do About Them*, UNSW Press, Australia, 1998, p. 166.
31. Irradiation of food packaging materials is increasing, and this is an area in which there may be potential health risks from packaging-radiation interactions.
32. IAEA, "Facts About Food Irradiation", ibid.

About the Author:
Susan Bryce is an Australian journalist and author of more than 70 published research articles. Susan publishes the *Australian Freedom & Survival Guide*, which aims to undermine the pervading myths surrounding the corporate consumer culture, globalisation and the New World Order. *AF&SG* encourages public debate and questioning of issues which are fundamental to our future freedom and survival. These issues include genetic engineering, food irradiation and related issues, Big Brother and the international surveillance regime, corporate power and global governance, and self-sufficiency in the 21st century.

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